

DRAFT
FLORIDA PHOSPHATE MINING STRATEGY SYNOPSIS
SEPTEMBER 4, 2003

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The Florida Phosphate Mining Strategy is a dynamic process that uses a cost-efficient approach to locate and characterize potential areas of concern with elevated levels of radiation resulting from phosphate related mining activities. The strategy further provides for the evaluation of potential threats to human health and response actions based primarily on chronic exposures to gamma radiation under residential use scenarios. The following is a brief synopsis of the components of the strategy. This summary is based on the detailed strategy as outlined in the "Draft Florida Phosphate Mining Strategy, US Environmental Protection Agency, Region 4, June 2003", as amended by the "Evaluation of Region IV, Draft Florida Phosphate Mining Strategy, August 22, 2003, Ellery Savage, EPA-ERT and Sam T. Windham, Consultant.

The site characterization phase of the strategy involves a tiered approach to evaluate phosphate mining areas that have been developed, or may be developed in the future for residential purposes. Because of the enormity of the study area (i.e., 1,300,000 acre mineable limit, of which, 550,000 acres have been mined) the assessment begins with a broad, comparatively lower-cost screening assessment, progressively moving towards more sensitive, and more costly, investigation methods.

Tier 1 - Aerial Gamma Radiation Survey

- Screens for elevated levels of radiation over entire phosphate mineable zone (1,300,000 acres).
- Provides economical means (i.e., \$1.15 per acre) for identifying areas with elevated levels of radiation. Provides data on non-mined, mined, and developed land.
- Flights at 500' altitude followed by 150' altitude to improve resolution.
- Data integrated with GIS-based mine locations and areas of residential development.
- UMTRCA indoor gamma radiation level of 20 μ r/hr used as a screening threshold value. Areas with levels below the criterion removed from further consideration. Areas with levels exceeding the 20 μ r/hr evaluated further under Tier 2.

Tier 2 - Ground-based Survey

- Vehicle based surveys used to further define potential areas of concern.
- Various gamma survey instrumentation used mounted on ground-based vehicles such as vans, trucks, ATVs, and golf carts. Method dictated by factors such as accessibility, terrain, survey size, etc.
- Data confidence improved using MARSSIM-based sampling.
- UMTRCA criterion of 20 μ r/hr used to determine whether or not to proceed to Tier 3.



Tier 3 - Site Specific Sampling

- Determinations for response actions based on site-specific sampling, including the collection of soil samples, groundwater samples, thermoluminescent dosimetry (TLD) measurement, and gamma radiation and radon gas measurements.
- UMTRCA criteria used to determine whether or not a response action is warranted based on 5 pCi/g of radium for soil; 5 pCi/l of radium for groundwater; and 20 μ r/hr of gamma radiation for indoor air.

The response action phase of the project would involve extensive planning. It is anticipated that a variety of gamma radiation, radon gas, and radium levels will be observed. Observed levels are expected to occur under a variety of land-use scenarios ranging from densely to sparsely developed residential areas; formerly mined areas planned for residential use; and formerly mined areas with no current plans for future use. The varying radiation types and exposures coupled with the varying uses will necessitate flexibility in determining appropriate response actions. The following is a list of approaches that may be applicable.

- Superfund Alternative approach for enforcement-lead projects.
- Removal Actions for areas of significantly elevated levels of contamination indicative of source areas.
- Interim Actions for complicated or multi-media contamination that requires phased responses.
- Long-term Remedial Actions for fund-lead for enforcement-lead sites with low-level contamination.

While EPA will have the primary responsibility for ensuring that the potential threats are properly addressed, efforts will be made to encourage the State and local governments to develop and implement programs that regulate the future land use in a way that mitigates potential future residential exposures to gamma radiation and/or radon gas. Concurrently, the mining industry will be encouraged to develop procedures to ensure that phosphate mining land made available for future residential development will be safe based on the criteria listed in Tier 3.

Radon gas has the potential for comprising a significant component of the radiation risks; however, radon gas alone has not historically triggered CERCLA response actions. In cases where response actions are necessary as a result of gamma radiation exposures, steps will be taken to concurrently address any radon gas exposures. However, actions will not be taken solely based on radon gas exposures.

Finally, this strategy is intended to address potential risks to human health under residential exposure scenarios. While the same characterization strategy would be applicable for the evaluation of potential industrial and recreational exposure scenarios, the residential exposure criteria listed in Tier 3 would need to be adjusted for the shorter exposure durations.